[Biol. Pharm. Bull., **16**, 182-187 (1993)] [Lab. of Pharm. Physical Chemistry]

**Controlled Release of Insulin from Plasma-Irradiated Sandwitch Device Using Poly-DL-lactic Acid.**

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The release behavior of insulin from a plasma-irradiated sandwitch (PIS) device using poly-DL lactic acid (PLA) was studied. The controlled release device can be obtained by oxygen plasma irradiation on the outer layer of the sandwitch device which was fabricated from an insulin-PLA matrix tablet as a core material and a mixture of plasma-degradable polyoxymethylene (POM) and PLA as a wall material. The release test indicated that insulin was released through the micropores formed by the vaporization of POM, and that the release behavior of insulin was affected largely by the molecular weight of PLA rather than the plasma operational condition. The release of insulin can be controlled by the use of PLA as the outer layer of the PIS device.

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**A New Drug Delivery System (DDS) Development Using Plasma-Irradiated Pharmaceutical Aids. IV. Controlled Release of Theophylline from Plasma-Irradiated Double-Compressed Tablet Composed of Polycarbonate as a Single Wall Material**

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A controlled-release tablet can be obtained by oxygen plasma irradiation on the outer layer double-compressed tablets prepared from theophylline as a core material and polycarbonate as a single wall material, making this possible that PC is of intramolecular bifunctionality, cross-linkable phenyl group and degradable carbonate group as an effect of plasma irradiation. It was shown that the dissolution profiles can be varied so as to cause release of theophylline at different rates, depending on the set of conditions chosen for tablet manufacturing as well as plasma operational conditions.

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**Quantum Chemical Study on Conformational Properties of Bipyridine Cardiotonics.**

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The conformational properties of bipyridine cardiotonics were investigated by means of quantum chemical (AM1) calculations. The calculations for the tautomeric and ionic structures of 3,4'-bipyridin-6(1H)-one showed that the equilibrium conformations in the ionic structures are more planar than those in the neutral structures and that the rotational barrier of the cationic pyridone structure is characteristically higher compared to those of the pyridinol tautomer and 1'-hydro-3,4'-bipyridinium cation. The difference in conformation between amrinone and milrinone is more distinctive in the neutral structures.